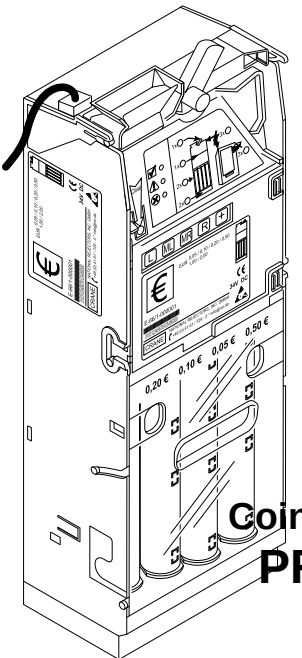
Technical documentation



Coin changer series PROTEUS E-66

User manual

incl. configuration by means of the setting module

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TABLE OF CONTENTS

1 General information 8

General information about this manual 8

General information about the coin changer 9

Advantages 10

Service tools 11

PC test station 11

Configuration tools 11

Update tools 12

2 Safety instructions 13

Proper use 13

Protecting yourself and equipment 14

3 Design 15

Overview of the device 15

The coin validator 16

Return lever 16

Keyboard 16

Pilot lights 16

Interfaces 18

Switching block 18

Label 18

The payout unit 19

Tube cassette 19

Payout module 20

Filling level sensors 20

MDB connecting cable to the vending machine 20

4 Functions 21

Filling and emptying change tubes 22

Considering the configured maximum number of coins in the change tubes 23

Considering the security stock of tube coins 23

Inhibiting certain coin types 24

Disabling the inventory keys 24

Configuring tokens 24

Sending the telephone/currency code to the vending machine control 25

Correcting the tube counter automatically 25

Resetting the tube counter 25

Considering the individual wake-up time 26

Accepting and converting a second currency (optional) 26

Minimizing string manipulation (optional) 26

5 Installation 27

6 Starting up 29

7 Operation 30

Giving out change using the keyboard or emptying the tube cassette 30

Emptying the change tubes up to a certain filling level 31

Filling up change through the validator 32

Inhibiting coin types using the switching block 33

8 Cleaning 35

9 Transport 36

10 Technical data 37

CE Certification 38

11 Configuration 39

Testing the coin changer in the workshop 39

Testing and configuring the coin changer in the workshop 40

Testing or configuring the coin changer in a vending machine on site 41

PC programming station (WinEMP) and Palm handheld (PalmE66, PalmEMP) 41

Which functions can be configured? 42

WinEMP 42

PalmE66 43

PalmEMP 43

Device environment and connection of the PC programming station 44

Connection of a Palm-Handheld 44

Setting module 45
Which functions can be configured? 45
Connection 46
Menu structure 46
Functions of the operating keys 47
Perform service functions 47
Giving out individual coins or emptying the tube cassette 48
Resetting the tube counters 49
Filling the tube cassette 50
Configuring tokens (teach tokens) 51
Displaying the coin changer's software version 52
Configuring the coin changer 53
Configuring float level for filling and emptying the tubes 54
Configuring maximum number of tube coins 56
Configuring security stock of tube coins 57
Configuring security stock, so that it can be paid out by the machine control 58
Transmitting the tube filling level including security stock to the vending machine 59
Inhibiting coin types 60
Disabling the inventory keys 62
Disabling the inventory keys, so that they can be enabled by the machine control 62
Configuring telephone/currency code 63
Suppressing the automatic tube counter correction 64
Configuring an individual wake-up time 65
Configuring the smallest coin value as the basis of calculations for the coin values 66
Configuring the sensitivity of the string sensor 67
Minimizing string manipulation 68

Index 69

Functions overview for setting module 77

SER functions 77

PRO functions 78

Troubleshooting 80

Quick diagnosis using pilot lights 80

Diagnosis using the setting module 83

1 GENERAL INFORMATION

This chapter should provide a general overview of the advantages and options regarding the coin changer E-66. However, the first section is designed to help you find your way through this manual with ease.

General information about this manual

This manual describes the design, operation and range of functions of the coin changer E-66. Chapters 5, 6 and 7 explain the necessary steps towards installation, starting up and operation of the coin changer.

Chapters 8 to 11 reveal how the coin changer is cleaned, transported and configured. The chapter entitled configuration mainly deals with the NRI setting module. The NRI configuration programs WinEMP, PalmE66 and PalmEMP are described separately in software instructions.

The appended chapters with side tabs "Index", "Function overview for the setting module", and "Troubleshooting" reduce the search for specific explanations and extra help.

To make it easier for you to navigate within this manual and to operate the device, the following markings were used within the text:

- **Safety instructions**, which have to be observed in order to protect operators and equipment, have been written in bold and been given the pictogram ⚠.
- Special *notes*, which should facilitate the use of the coin changer and the setting module, have been written in italics and also been given a pictogram ☞.
- Requests to perform an action are given sequential numbers (1., 2., 3. etc.).
- At the beginning of a chapter you will find a "chapter guide", which summarizes the content of the chapter.

To configure the coin changer reference is made to the separate software instructions (compare Chap. 11 "Configuration"):

- WinEMP – The configuration and diagnostics program for NRI coin validators, operating instructions for the PROTEUS E-66
- PalmE66 – operating instructions for configuration of coin changer PROTEUS E-66
- PalmEMP – Operating instructions for configuration of coin validator E-66.4000

If these instructions are not available to you, they can be downloaded at any time from the NRI homepage (www.nri.de) in a compressed PDF format.

General information about the coin changer

The 4 tube coin changer series E-66 are designed for vending and service machines with the serial MDB interface (MDB = **M**ulti **D**rop **B**us).

The integrated coin validator has the reliable sensor system and false money rejection of the already tried and tested coin validator G-40.4000 from the G-46.4. coin changer series.

To be able to react as quickly as possible to new false coins and to enable you to make your individual adjustments, the coin validator can be connected to a PC programming station which is made up of the configuration and diagnostics software "WinEMP" including card reader and chip card as well as the tester G-19.0641. With the aid of the Palm handheld programs "PalmEMP" and "PalmE66" or the G-55.0460 setting module, you can configure the coin changer directly on the vending machine, independently from the PC. This manual deals with configuration of the coin changer exclusively on the setting module. For the configuration programs, separate software instructions are available. (see section "Service tools" in this chapter and Chap. 11 "Configuration").

Tokens which were not programmed at the manufacturer, can be programmed directly on the coin changer by inserting the tokens.

Advantages

- A coin validator which is easy to configure enables a fast reaction to changing market situations and new false coins
- Easy configuring with help from
  - the PC software "WinEMP" for the workshop
  - the Palm handheld software "PalmE66" and "PalmEMP" or the setting module directly on the vending machine
- Reliable sensor system and optimum rejection of false coins due to the integrated, electronic coin validator E-66.4000
- Universal payout mechanism for different coin diameters and thicknesses
- Flexible payout combinations by easy change of tube cassettes
- Faster service due to error diagnosis
- Splash-proof electronics
- Monitored coin run and controlled sorting guarantee an improved operating reliability and protection against manipulation
- Acceptance speed of 2 coins per second
- Teach mode, able to teach up to three different tokens
- Flash technology for uncomplicated and time-saving coin validator operating software updates

Service tools

In order to test the coin changer and adapt it to your individual needs, you can acquire the following accessories from NRI:

PC test station

If you only wish to check the functionality of the coin changer without making any adjustments, the NRI test station is sufficient. This is composed of the following two components:

- Test software "WinMDB" (ordering code 23833) and
- Tester G-19.0654 (ordering code: 24257) for vending machine simulation and to test the MDB functions

If you wish to test all functions and not only the MDB functions, you can additionally obtain from the NRI company the western modular plug-PC-adaptor G-55.0348 (ordering code: 19794), with which you can connect the coin changer to the PC using the easily accessible western modular plug on the top right of the device.

Configuration tools

To be able to react as quickly as possible to new false coins, in the workshop or on site, and enable you to make your individual adjustments, the coin changer can be connected to:

- NRI programming station consisting of
  - configuration and diagnostics software "WinEMP" including card reader and chip card (ordering code: 20119 for basic module and 23648 for additional module)
  - Tester G-19.0641 (ordering code: 12922)
- NRI Palm applications "PalmEMP" and "PalmE66" for a Palm handheld
- Setting module G-55.0460 (ordering code: 14803)

Chapter 11 "Configuration" reveals which configuration tool can be used to set the different parameters.

Update tools

The coin changer's integrated coin validator is equipped with a microprocessor that has a flash memory. This allows the coin validator operating software to be updated quickly and without complications. In order to load new operating software in the coin validator, you need one of the three following alternatives:

- NRI PC update station consisting of
  - Software "WinFlash" (ordering code: 21524)
  - Tester G-19.0641 (ordering code: 12922)
  - Programming adapter G-19.0646 (ordering code: 17688)
- NRI Flash Prommer G-55.0350 (ordering code: 21333)
- NRI Palm application "PalmFlash" for a Palm handheld and and a flash adapter

2 SAFETY INSTRUCTIONS

Before operating the device for the first time, please read through this manual carefully at least once, and most importantly the safety instructions.This to ensure you have understood the contents of this manual as well as how to operate the coin changer.

Proper use

The 4 tube coin changer series E-66 are intended for use in vending and service machines with the serial MDB interface. Only use this coin changer for this purpose. Under no circumstances can the manufacturer be held liable for any damage or loss resulting from improper use of the device.

The coin changers have been constructed in compliance with the state of the art and the recognized safety regulations. Nevertheless this equipment can be a source of danger. Therefore please observe the following safety regulations.

Protecting yourself and equipment

The coin changer may only be connected by a qualified electrician.

Only use the coin changer according to proper use. Under no circumstances can the manufacturer be held liable for any damage or loss resulting from improper use of the device.

The coin validator pcb is fitted with components which may be damaged beyond repair by electrostatic discharges. Please observe the handling instructions for components at risk due to static.

Select the correct voltage for the coin changer (see label).

Never pull the connecting cable of the coin validator from the coin changer when a voltage is applied.

Pull the vending machine's mains plug before you install, clean or remove the coin changer.

Always transport the changer without any coins in it and in its original packaging. It is only in this way sufficiently protected. Never carry it by means of the cables.

Contact NRI if you wish to alter the design of the device to a greater extent than that described in these instructions.

Keep water and other liquids away from the coin changer.

Dispose of the device correctly, if you have no further use for it.

We reserve the right to make technical modifications to the device which are not covered by these instructions.

3 DESIGN

This chapter describes the general design of the coin changer and the components of the coin validator, which are important for operating the device.

- return lever, keyboard, pilot lights, interfaces, switching block, label
- tube cassette, pay out set, filling level sensors

Overview of the device

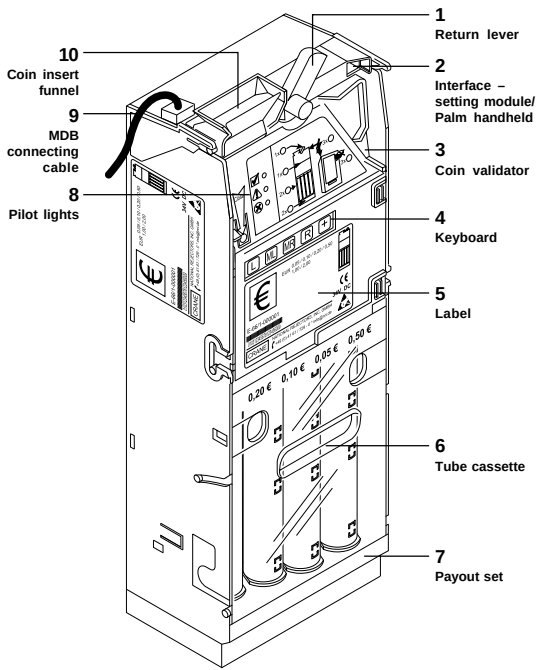


Fig. 1a: Design

The coin validator

Coins inserted into the coin validator **3** pass through the coin insert funnel **10** into the validation area of the device, in which their coin properties are compared with the values of the stored acceptance bands. From the coin validator the rejected coins pass into the return area of the vending machine, in the event of a sale, accepted coins are either directed to the tube cassette **6** or to the cash-box. (See Fig. 1a)

Return lever

The return lever **1** on the top of the coin validator is operated using the return button on the vending machine, if the coins which have already been inserted are to be returned or a jam caused by coins which have become stuck needs to be removed. When the return lever is operated, the measurement and validation area of the coin validator opens so that all objects within the coin validator are directed to the return area. (See Fig. 1a)

Keyboard

The front of the coin validator is equipped with five touch-senstive keys **4** by which the payout unit's change tubes are filled, before the device is put into operation, and emptied for the inventory (see Fig. 1a as well as Chap. 4 "Functions" and Chap. 7 "Operation").

Pilot lights

At the front of the coin validator there are three light-emitting diodes (LEDs) positioned underneath one another **8** (green, yellow, red). These pilot lights are mainly used for fast diagnosis in case of fault but also as indication of the current status in normal operation. If the green LED at the top lights up or flashes, there are no faults and the device is working properly. If the yellow light in the middle flashes there is a definite fault which in general, can be easily remedied. If the red LED at the bottom flashes, it is likely to be a fault that must be remedied by a service technician. (See. Fig. 1a as well as the appended chapter "Troubleshooting")

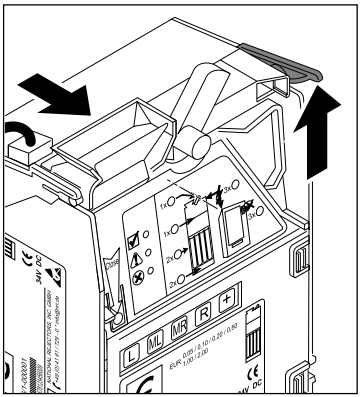
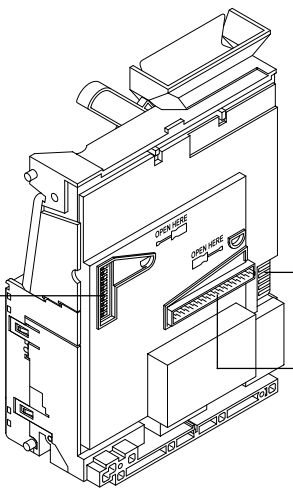


Fig. 1b: Remove coin validator



13
Switching block

11
Interface – PC test and programming station

12
Interface – coin changer

Fig. 1c: Rear of coin validator

Interfaces

On the rear of the coin validator in the middle, there is an interface **12**, by which the device can be connected to the coin changer using a flat cable (already assembled). On the front of the coin validator to the top right, there is a western modular plug **2** by which the coin changer can be connected to a Palm handheld or the setting module for configuration purposes. On the left side there is pcb direct plug **11** which connects the validator to the PC programming and test station. (See Figs. 1a, 1b and 1c)

Switching block

Individual settings such as inhibiting various coin types can be made using the switching block **13** on the rear of the device (see Figs. 1b and 1c as well as Chap. 7 "Operation").

Label

The label of the coin validator contains all the data defining the device such as device type and series, as well as data programmed according to customer specifications, such as currency and coin type.

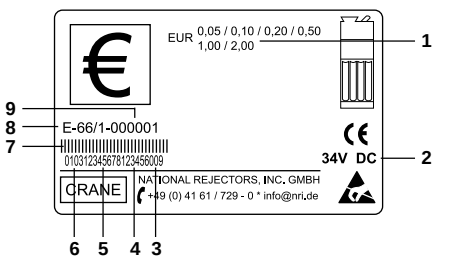


Fig. 2: Label of the coin changer

1 Currency and coin type
2 Nominal voltage
3 Serial device number per order number (3 digit)
4 Order number (6 digit)
5 Ordering code (8 digit)
6 Date of manufacture (4 digit)
7 Barcode
8 Device type
9 Data block number

The payout unit

The payout unit consists of the tube cassette with payout set. To monitor the tube cassette, the device is equipped with filling level sensors and tube counters.

Tube cassette

The tube cassette **1** incorporates four change tubes with different diameters for collecting up to four different coin types, which can be paid out to the customer. Which tube can accept which coin, is identified by the sticker at the top of the tube cassette. The storage capacity for tube coins depends on the thickness of the coin type (guideline: approx. 62 times 0.50 Euro coins per tube).

Depending on the programming, the coin validator tests whether an accepted coin should be sorted into one of the four tubes or directed to the cash-box.

If at any time you require another combination of tube coins, the appropriate cassette can be ordered from the NRI company and simply be exchanged (see Fig.3).

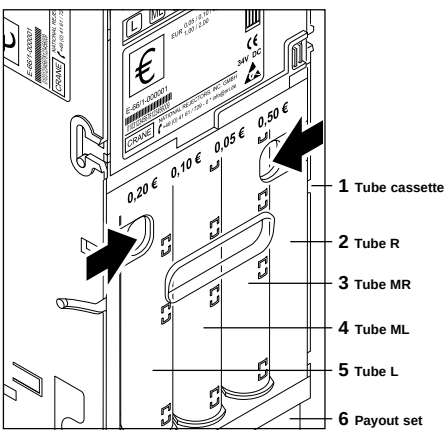


Fig. 3: Remove/replace Tube cassette

Payout module

Paying out of change is done by means of two motors installed in the bottom of the payout set **6**, which turn in order to pay out coins. The left-hand motor is responsible for the "left" **5** and "middle left" **4** tubes and the right-hand motor is responsible for the "right" **2** and "middle right" **3** tubes. (See Fig. 3)

Filling level sensors

Independent from the number of coins, the filling level of every tube is monitored by four sensors:

- Empty sensor positioned to the height of 8 to 10 collected coins
- 50% sensor
- 75% sensor
- Full sensor positioned at the top rim of the tube

In order that the tube counters function without fault, not only when the change tubes are filled by inserting coins into the coin changer (whereby the tube counters count them in), but also when the tubes are filled by removing the tube cassette, the filling level sensors check the tube counter status for plausibility after every coin acceptance and coin pay out. If the number of coins does not correspond with the measured filling level, the tube counter will be corrected depending on the respective coin thickness.

If the "full" sensor of a tube displays the message "tube full", all further coins for this tube will be directed automatically to the cash-box. Only when coins have been paid out of this tube again, will more be sorted into this tube.

MDB connecting cable to the vending machine

The connecting cable to the vending machine with MDB interface is installed on the top left of coin changer. For details of how to install the coin changer in a vending machine, see Chap. 5 "Installation".

4 FUNCTIONS

This chapter describes the main functions of the coin changer, particularly:

- Filling and emptying the change tubes
- Considering the maximum number of coins configured to the change tube
- Considering the configured security stock of tube coins
- Inhibiting certain coin types
- Disabling the inventory keys
- Configuring tokens
- Sending the telephone/currency code to the vending machine control
- Correcting the tube counter automatically
- Resetting the tube counter
- Considering the individual wake-up time
- Accepting and converting a second currency (optional)
- Minimizing string manipulation (optional)

Only the functions will be described in this chapter. If you wish to change adjustable functions, see Chap. 7 "Operation" for adjustments directly on the coin changer, and Chap. 11 "Configuration" for settings using the configuration tools.

Filling and emptying change tubes

The simplest and quickest way to fill and empty the tube cassette, is to pull out the cassette (see Fig.4) therefore allowing you to sort or respectively remove several coins at once.

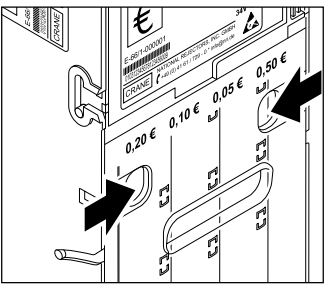


Fig. 4: Pulling out the tube cassette

If the correct number of tube coins is needed to simplify management of coins, the change tubes can be filled by inserting single coins into the coin changer. Activated by the keyboard, the tube counters register every coin inserted or paid out (see Chap. 6 "Starting up" and Chap. 7 "Operation").

In this way the tube cassette can also be both filled and emptied with the help of the PC software, the Palm handheld software or the setting module (see Chap. 11 "Configuration").

Coins are paid out individually, e.g. for test purposes, or one after another for an inventory or before transportation of the device.

Should you wish the tubes to always be filled or emptied at a certain filling level by means of service personal, a so-called float level can be configured (see Chap. 11 "Configuration"). This filling level is irrelevant for normal use and only guarantees that for accounting purposes a known number of coins can be presumed. If the float up function is activated, the cash-box coins will not be accepted, therefore the cash-box must not be emptied before the tubes are refilled, as coins, which are not accepted, will not be counted during refilling.

Considering the configured maximum number of coins in the change tubes

The coin changer can be configured in such a way that every change tube will accept at least a certain number of coins. If in a tube this number is reached, all further coins for this tube will be directed automatically to the cash-box. Only when coins have been paid out of this tube, will more be sorted into the tube. (See Chap. 11 "Configuration")

If this function is not used, the full sensor at the top of the tubes determines, irrespective of the number of coins, from when the coins will be sorted into the cash-box and no longer into the tubes.

Considering the security stock of tube coins

If a security stock is configured for the individual tubes, the coin changer will not pay out a minimum number of tube coins. The security stock can be between 1 and 9. It should be set higher for coins which have problems with stacking and stand upright rather than lay flat, as they do not spring back as easily, if they fall onto a higher stack (see Chap. 11 "Configuration").

The coin changer can also be set in such a way that the configured security stock can be paid out of the vending machine and that also the security stock can be sent to the vending machine, when the machine polls the filling level (see Chap. 11 "Configuration").

Inhibiting certain coin types

If certain coin types should no longer be accepted as payment at the vending machine (e.g. because their are too many false coins of a particular type in circulation), these coins can either be inhibited directly on the device by means of the switching block on the rear (see Chap. 7 "Operation") or with the help of the PC software, the Palm handheld software or the setting module (see Chap. 11 "Configuration").

Disabling the inventory keys

The inventory keys constitute a part of the coin changer's keyboard: keys L, ML, MR, R. These keys allow the paying out of one, several or all coins from the corresponding change tube L, ML, MR, R. Should these keys no longer be operated, they can generally be inhibited, or in such a way that they can be enabled by means of the vending machine control. (See Chap. 11 "Configuration")

Configuring tokens

The coin changer has three memory locations (coin channels) for configuring a maximum of three tokens. The measured values of a token can therefore be newly assigned to a coin channel directly on the vending machine by inserting the corresponding tokens. The acceptance band generated then accepts these tokens for payment in the vending machine.

In addition, you can choose between a normal and wide acceptance band for the configured tokens. However, a wide acceptance band should only be set if a limited number of the tokens are available for generating the token measurement values, or if the tokens show very large tolerance values. Otherwise there is the danger that too many false coins will be accepted.

Either tokens can be configured, so that the customer gets his product selected free of charge (free vend tokens), or the tokens are assigned a certain value (value tokens). The coin changer can direct accepted tokens either into the cash-box or for the customer back into the return area.

Chapter 11 "Configuration" reveals which configuration tool can be used to configure tokens.

Sending the telephone/currency code to the vending machine control

Depending on which country the machine is installed in, a telephone or currency code can be set on the coin changer and, e.g. for menu text and display, can be sent to the vending machine control.

For more details on how to change the pre-programmed telephone or currency code, please see Chap. 11 "Configuration".

Correcting the tube counter automatically

Usually after every coin acceptance and pay out, the coin changer compares the tube counter status and the measured filling level of the sensors and, if necessary, corrects the tube counter. If the vending machine control is unable to process the automatic correction of the tube counter, the coin changer can be set so that the tube counter will not be corrected (see chap 11 "Configuration").

In this case, the change tubes should be filled by inserting the coins into the coin changer and not by placing the coins directly into the tube cassette (see Chap. 6 "Starting up" or Chap. 7 "Operation").

Resetting the tube counter

After the change tubes have being emptied for e.g. repairs, the tube counters of the coin changer, for which the tube counter correction is switched off, should be reset for re-starting, so that the tube counter starts to count from zero when the tubes are being filled rather than from the stored number of coins (see Chap. 11 "Configuration").

Considering the individual wake-up time

For coin changers which work with battery and external wake-up line, a time can be set which specifies how long the coin changer remains switched on after the last time the vending machine polled the coin changer (wake-up time) (see Chap. 11 "Configuration"). After the wake-up time has elapsed the coin changer automatically switches itself off and must be "woken" again by the vending machine control activating the external wake-up line.

Accepting and converting a second currency (optional)

Should you wish the coin changer to accept two currencies, the second currency can be converted in the main currency using a set rate. The second currrency is rounded up or down respectively in such a way that it can be managed by the main currency.

Chapter 11 "Configuration" reveals which configuration tool can be used to program a second currency.

Minimizing string manipulation (optional)

The coin changer can optionally be equipped with a string sensor. This recognizes coins which are inserted into the device on a string and then inhibits the coin from being accepted. By this security measure these coins will not generate any credit. The sensitivity of the string sensor can be individually set (see Chap. 11 "Configuration").

After an attempt of string manipulation it is additionally possible to sort the tube coins of the next 100 coins inserted, into the cash-box and not into the tubes. Coins, sorted into the cash-box, are less prone to manipulation so that further attempts of a string manipulation would fail (see Chap. 11 "Configuration").

5 INSTALLATION

The E-66 is either

- started up in a machine, or
- connected to the NRI test station (WinMDB) for test purposes or
- connected to one of the following NRI configuration tools for setting purposes:
  – PC programming station (WinEMP)
  – Palm handheld (PalmE66/PalmEMP)
  – Setting module G-55.0460

This chapter describes how to connect the coin changer to the vending machine. For details on how to connect the service tools, see Chap. 11 "Configuration".

To avoid damage to the equipment, please make sure that you check the following before installation:

- **that the MDB connecting cable of the coin changer is suitable for the vending machine interface.**
- **that the coin changer's supply is the same as the nominal voltage on its label.**

How to install the coin changer in the vending machine:

1. Pull the vending machine's mains plug.
2. Hang the coin changer in the vending machine using the three mounting holes on the back wall of the validator (two at the top **1** and one at the bottom) (see Fig. 4a).

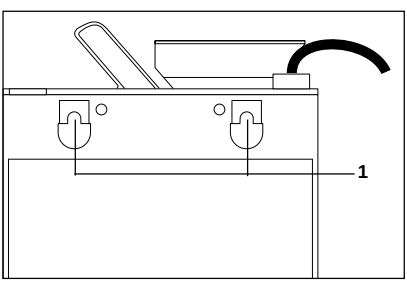


Fig. 4a: Hanging the coin changer in the vending machine

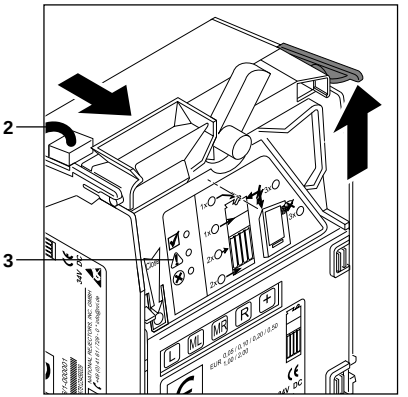


Fig. 4b: Pulling out the coin validator

3. Pull out the coin validator (see Fig 4b).

Make sure that the coin validator is safely connected to the coin changer with the flat cable.

4. Screw the coin changer's housing to the vending machine tightly.
5. Put the coin validator back in and engage.

Make sure that there is an air space between the return lever of the vending machine and that of the coin changer.

6. Connect the coin changer to the vending machine by means of the MDB connecting cable **2** (see Fig. 4b).
7. Reconnect the vending machine to the mains supply. The three LEDs **3** on the coin validator light up briefly to test their function. Afterwards, the green LED lights up. The coin changer is operational (see Fig. 4b).

6 STARTING UP

As the individual functions are programmed by the manufacturer to the customer's specifications, the first time the device is put into operation, you must only fill the four change tubes of the tube cassette with the relevant coin types.

In many cases the vending machine control offers a filling function. In this case, this should be used, as the control unit perhaps, cannot accept the filling level of the coin changer.

If the cash-box is not empty, it must be emptied as the coins which are directed to the cash-box will not be counted. If the float up function has been activated by the manufacturer, the cash-box coins will not be accepted at all. In this case the cash-box must not be emptied.

1. Press the [+]-key.
   An acoustic signal and the flashing of the green LED show that the coin changer is no longer in operating mode, but in filling level mode.
2. Insert tube coins.
   The relevant tube counter counts in the accepted coins, and the coin changer sorts the corresponding coin type into its configured tube: either until
   – the full sensor is covered,
   – the max. coin number configured, or
   – the float level is reached.

   Tube coins inserted thereafter will not be accepted and directed into the return area, if the float up function is activated. Otherwise they will be accepted and directed into the cash-box.

If all tubes are full:

3. Press the [+]-key again.
   Two acoustic signals and the green LED lighting up show that the coin changer is no longer in filling level mode, but back in operating mode.

If no coins are inserted in a 30 second time period, the coin changer returns to the operating mode, without having to press the [+]-key again.

7 OPERATION

In this chapter you will see how to carry out functions and settings, directly on the coin changer using the operating elements (the keyboard and switching block), rather than with additional tools.

Giving out change using the keyboard or emptying the tube cassette

Coins can be paid out from the change tubes either individually, if you need to test the coin acceptance, or one after another when the tubes need to be emptied e.g. before transit, for repairs, or in case of an inventory.

The inventory keys L, ML, MR and R apply to the tubes "left", "middle left", "middle right", and "right".

If the coin changer is configured in such a way that the inventory keys are disabled, these keys cannot be used. Either the device is set up in such a way that the keyboard can be enabled by the vending machine control, or the keyboard must initially be activated by a configuration tool (see Chap. 11 "Configuration").

To give out tube coins individually, simply press the corresponding key. One coin will be given out each time the key is pressed.

To pay out several tube coins:

1. Hold down the corresponding key L, ML, MR or R for approx. five seconds.
   The tube will be automatically emptied, without having to press the key again.
2. Press any other key.
   The coins will stop being given out.

Emptying the change tubes up to a certain filling level

If a float level is configured, the change tubes can be emptied up to the tube counter status of the float level.

If the coin changer is configured in such a way that the inventory keys are disabled, these keys cannot be used. Either the device is set up in such a way that the keyboard can be enabled by the vending machine control, or the keyboard must initially be activated by a configuration tool (see Chap. 11 "Configuration").

Emptying the change tubes up to the float level:

1. Press the [+]-key.
   An acoustic signal and the flashing of the green LED show that the coin changer is no longer in operating mode, but in filling level mode.
2. Hold down any key [L], [ML], [MR] or [R] for approx. five seconds (green LED lights up).
   All tubes will automatically be emptied up to the configured float level. Afterwards, two acoustic signals and the green LED lighting up show that the coin changer is no longer in filling level mode, but back in operating mode.

Filling up change through the validator

After an inventory or repair, you can also fill up the tube cassette's four change tubes with the relevant coin types through the validator using the keyboard.

In many cases the vending machine control offers a filling function. In this case, this should be used, as the control unit perhaps, cannot accept the filling level of the coin changer.

If the cash-box is not empty, it must be emptied as the coins which are directed to the cash-box will not be counted. If the float up function has been activated, the cash-box coins will not be accepted at all. In this case the cash-box must not be emptied.

1. Press the [+]-key.
   An acoustic signal and the flashing of the green LED show that the coin changer is no longer in operating mode, but in filling level mode.
2. Insert tube coins.
   The relevant tube counter counts in the accepted coins, and the coin changer sorts the corresponding coin type into its configured tube: either until
   – the full sensor is covered,
   – the max. coin number configured, or
   – the float level is reached.

   Tube coins inserted thereafter will not be accepted and directed into the return area, if the float up function is activated. Otherwise they will be accepted and directed into the cash-box.

If all tubes are full:

3. Press the [+]-key again.
   Two acoustic signals and the green LED lighting up show that the coin changer is no longer in filling level mode, but back in operating mode.

If no coins are inserted in a 30 second time period, the coin changer returns to the operating mode, without having to press the [+]-key again.

Inhibiting coin types using the switching block

With the help of the switching block on the rear of the coin validator, you have the possibility to inhibit configured coin types on the first eight memory slots (coin channels) of the coin changer without additional configuration tools. For details on which coin type has been programmed for which coin channel, please contact the NRI company or connect the validator to WinEMP, PalmE66 or PalmEMP (see Chap. 11 "Configuration")

To inhibit a coin type:

1. Pull the coin validator out from the coin changer (see Fig. 5a).

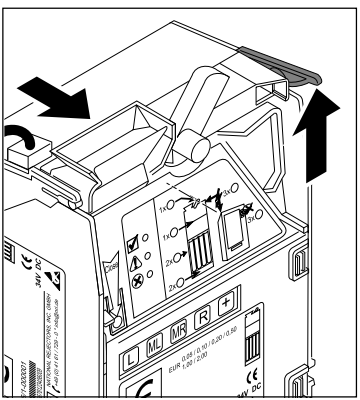


Fig. 5a: Pulling out the coin validator

Make sure that the coin validator is safely connected to the coin changer with the flat cable.

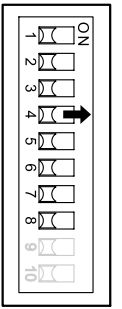


Fig. 5b: Switching block of the coin validator

2. Push the DIL switches (1 to 8) to the right hand side ON position using e.g. a pen (see Fig. 5b).
   The assigned coin types will no longer be accepted and from now on will be directed into the return area.
3. Put the coin validator back in and engage.

With the aid of the configuration tools, you have the possibility to inhibit all programmed coin types (see Chap. 11 "Configuration").

8 CLEANING

Only the coin validator must be wiped clean from time to time with a damp cloth (luke warm water with some washing up liquid):

Under no circumstances may the cloth be so wet that fluid runs into the device. Otherwise the pcb will be damaged.
Do not use any solvents or scouring agents which attack the plastic of the device.

1. Pull the vending machine's mains plug.
2. Press the lever **1** on top and open the coin validator (Fig. 6).
3. Wipe the coin runway inside the coin validator clean.
4. Press "Close" arrow **2** so that the metal spring engages behind the lever **1**, in order to close the coin validator (Fig. 6).
5. Reconnect the vending machine to the mains supply.

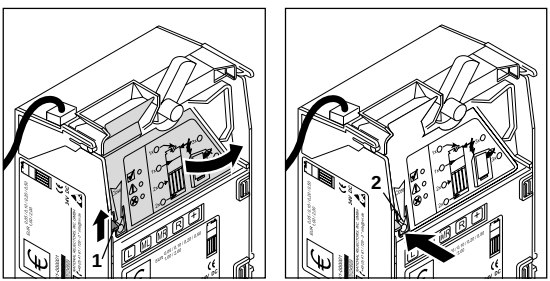


Fig. 6: Open up the coin validator flight deck and close

9 TRANSPORT

Please empty the tube cassette before you transport the device so that the coins do not fall out.

Pull the vending machine's mains plug before you remove the coin changer.

To avoid damages, only ever transport the device in its original packaging and under no circumstances carry it by the cable.

10 TECHNICAL DATA

Coin acceptance:	Max. 20 coin types, max. 16 different (from them up to 3 tokens) Coin diameter: 15–33 mm Coin thickness: 1.2–3.5 mm
Coin payout:	4 coin types out of a tube cassette (coin diameter and thickness depends on specific tube cassette)
Device dimensions:	Height: 380.0 mm Width: 133.5 mm Depth: 76.5 mm (80 mm with return lever pressed)
Machine interface:	Serial MDB interface (**M**ulti **D**rop **B**us)
Mounting position:	Vertical (max. deviation 2°)
Temperature range:	-20 °C to +75 °C
Humidity:	max. 90 %
Nominal voltage:	24 V DC
Power consumption:	standby 1.2 VA; max. 6 VA with 24 V DC
Noise immunity:	The device fulfils the current requirements on generic immunity and generic emission according to EC directives (EMC law)
Safety prescriptions:	Low voltage directive

CE Certification

The CE certificate (CE = Communautés Européennes) confirms that our products comply with specified basic requirements of the applicable directive. The CE certificate is not a quality assurance certificate in terms of the quality expected by the manufacturer but only in terms of the quality demanded legally. It is a pure administrative certificate and is intended only as proof of compliance with the directives for the monitoring authorities and not directed at clients or final customers.

Which directives were applied can be seen in the declaration of conformity. The manufacturer must keep this declaration available for the monitoring authorities only (for a minimum period of 10 years after the last product has been introduced to the market). However, upon request we can provide copies of this declaration for our customers.

The following directives and their subsequent changes can be partially applied to our devices:

1. The EMC Directive (89/336/EEC)
   for devices which cause electromagnetic interference or are interfered with by such.
2. The Low Voltage Directive (73/23/EEC)
   for electrical equipment which is used with a nominal voltage of between 50 and 1000 V AC and 75-1500 V DC.
3. The CE Certificate Labelling Directive (93/68/EEC)
   Modification directive regarding the application and use of CE labels.

11 CONFIGURATION

To be able to react as quickly as possible to new false coins, in the workshop or on site, to test the coin changer and enable you to make your individual adjustments, there are different service tools available, to which the coin changer can be connected.

This chapter

- presents the individual tools you require depending on where the validator is to be tested or configured.
- lists the functions which you can set with each tool.
- lists the equipment which is required for testing or configuration, with the respective tool.
- briefly shows how to connect the tools to the coin changer.
- describes in detail the configuration of the coin changer with the NRI setting module G-55.0460, for which there are no separate instructions.

Testing the coin changer in the workshop

If you only wish to check the functionality of the coin changer without making any adjustments, the NRI test station is sufficient. This is composed of the following two components:

- Test Software "WinMDB" (ordering code: 23833) and
- Tester G-19.0654 (ordering code: 24257) for vending machine simulation and to test the MDB functions

Testing and configuring the coin changer in the workshop

If you wish the coin changer to be tested and configured in the workshop, you can employ all three of the NRI configuration solutions:

- PC programming station consisting of
  - configuration and diagnostics software "WinEMP", including card reader and chip card (ordering code: 20119 for basic module and 23648 for additional module)"
  - Tester G-19.0641 (ordering code: 12922) for the power supply
- A Palm handheld with
  - PalmEMP and PalmE66 installed
  - Tester G-19.0641 (ordering code: 12922) or G55.0338 (ordering code: 15967) for the power supply
- Setting module G-55.0460 (ordering code: 14803) with the tester G-55.0338 (ordering code: 15967) for the power supply

If you do not wish the payout unit to be tested, it is not necessary to dismantle the whole coin changer. In this case it is sufficient to remove the coin validator from the coin changer in order to configure or test it.

If you do not wish to connect the G-19.0641 tester using the pcb direct plug behind the coin changer housing, but the G-55.0338 tester by means of the MDB connecting cable, and nevertheless be able to test all functions and not only the MDB functions, you can additionally obtain from the NRI company the western modular plug-PC-adaptor G 55.0348 (ordering code: 19794), with which you can connect the coin changer to the PC using the easily accessible western modular plug on the top right of the device.

Testing or configuring the coin changer in a vending machine on site

If you wish the coin changer in a vending machine to be tested or configured on site, you can use both mobile NRI configuration tools:

- A Palm handheld with PalmEMP and PalmE66 installed
- setting module G-55.0460 (ordering code: 14803)

PC programming station (WinEMP) and Palm handheld (PalmE66, PalmEMP)

There are separate operating instructions available for the PC and Palm handheld software WinEMP, PalmE66 and PalmEMP, in which all necessary steps for configuring the coin changer from installation, to its connection and operation are described in detail. This user manual only gives you a general overview relating to this.

The "WinEMP" or "PalmE66" and "PalmEMP" software is used to diagnose and configure NRI coin validators as well as update the data block in the device memory (data block download). All three programs identify the connected coin validator and the device's own data and present them on screen of your PC or on the Palm handheld display.

Which functions can be configured?

All available functions of the coin changer can be set with the PC programming station and WinEMP, whereas with both Palm handheld programs only some of the functions can be set. However, both programs together allow the same configuration possibilities as WinEMP.

In addition to the diagnostics of the coin changer, e.g. in service cases, you can set the following functions:

WinEMP

- Giving change out of the tube cassette
- Resetting the tube counters
- Optimizing acceptance of genuine coins und rejection of false coins
- Configuring new coin types and tokens
- Configuring other tube coins
- Configuring maximum number of tube coins
- Configuring security stock
- Inhibiting individual coin types
- Disabling the inventory keys
- Configuring telephone and currency code
- Suppressing/activating the tube counter correction
- Configuring an individual wake-up time
- Configuring a second currency including conversion factor
- Minimizing string manipulation
- Configuring smallest coin value with decimal point as reference value and basis for calculations, for all coin types
- Data block download for current coin information
- Restoring old configuration state of coin changer
- Storing coin changer settings for standard configuration (cloning)

PalmE66

- Giving change out of the tube cassette
- Resetting the tube counters
- Configuring up to three tokens
- Configuring other tube coins
- Configuring maximum number of tube coins
- Configuring security stock
- Inhibiting individual coin types
- Disabling the inventory keys
- Configuring telephone and currency codes
- Suppressing/activating the tube counter correction
- Configuring an individual wake-up time
- Configuring a second currency including conversion factor
- Minimizing string manipulation
- Configuring smallest coin value with decimal point as reference value and basis for calculations, for all coin types
- Storing coin changer settings for standard configuration (cloning)

PalmEMP

- Optimizing acceptance of genuine coins und rejection of false coins
- Configuring new coin types and tokens (acceptance band only, no type of token)
- Data block download for current coin information
- Storing coin changer settings for standard configuration (cloning)

Device environment and connection of the PC programming station

The PC programming station consists of

- configuration and diagnostics software"WinEMP" including card reader G-19.0647 and chip card (ordering code: 20119 for basic module and 23648 for additional module (data block download))
- tester G-19.0641 (ordering code: 12922) for the power supply

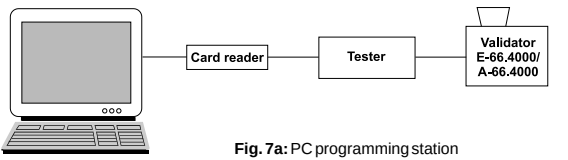


Fig. 7a: PC programming station

Connection of a Palm-Handheld

"PalmEMP" and "PalmE66" are NRI software solutions which can be installed on a Palm handheld as additional applications. You can connect the Palm handheld quite simply to the coin validator or coin changer by means of a connecting cable (scope of delivery for software).

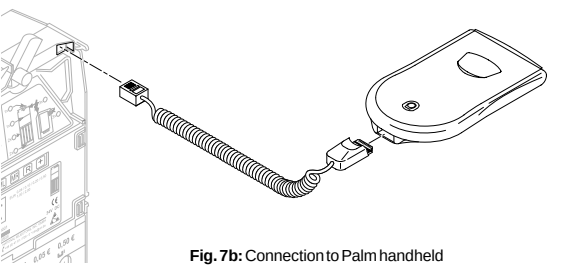


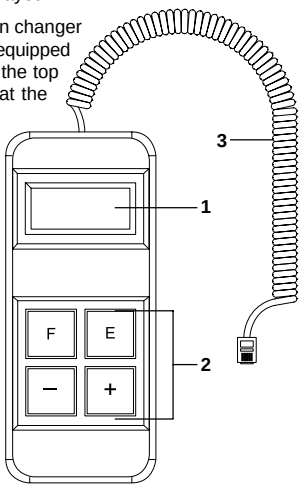
Fig. 7b: Connection to Palm handheld

Setting module

With the G-55.0460 setting module you can

- perform service functions,
- check or change settings and
- have error messages displayed.

To configure the individual coin changer functions, the setting module is equipped with a 7 segment display **1** at the top and with four operating keys at the bottom **2**. It can be connected to the coin changer using the connection cable **3** installed.



Which functions can be configured?

- Giving change out of the tube cassette
- Filling/emptying the change tubes
- Resetting the tube counters
- Configuring up to three tokens (acceptance band only, no type of token)
- Configuring maximum number of tube coins
- Configuring security stock
- Inhibiting single coin types
- Disabling the inventory keys
- Configuring telephone/currency code
- Suppressing/activating tube counter correction
- Configuring an individual wake-up time
- Minimizing string manipulation
- Configuring smallest coin value with decimal point as reference value and basis for calculations, for all coin types

Connection

To connect the setting module to the coin changer when it is installed in the vending machine, the western modular plug must be plugged into the socket on the top right of the coin validator (see Fig. 7c).

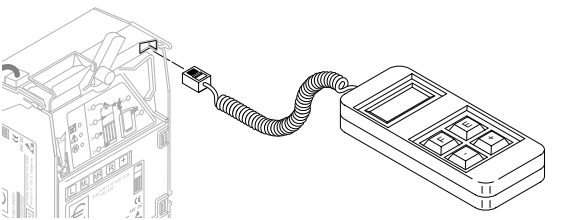


Fig. 7c: Connection to setting module

After the setting module is connected the display shows nothing. The setting module is in standby.

Menu structure

On the setting module, the coin changer functions are divided into three menus: DIS menu, PRO menu, SER menu.

The DIS menu is not pre-set with any functions and is reserved for future applications.

In the SER menu service functions can be performed: emptying and filling the tube cassette, resetting the tube counter and teaching a maximum of three tokens.

In the PRO menu you will find all the other coin changer functions whose settings can be configured.

Both menus are divided into numbered main functions and their sub-functions.
Example:
Main function PRO 25 = Configure maximum number of tube coins,
Sub-functions PRO 25 01 to 25 04 = Configure number for tube "left", "middle left", "middle right" and "right".

Functions of the operating keys

The four operating keys are assigned with different functions, depending on the menu which is called up:

F
Call up PRO or SER menu or
coin changer function,
Store settings

E
Activate function called up or
1st sub-function,
Highlight setting so that it can be changed
Move cursor to the left
Display software version of the coin changer

–
In the PRO menu:
Reduce setting by one step and return to standby
In the SER menu:
return to standby

+
Fast selection of the function "fill tubes"
In the PRO menu:
Increase setting by one step and return to standby
In the SER menu:
Return to standby

If a key is not pressed for some time, the display clears automatically. The setting module returns to standby.

Perform service functions

This section describes how to perform service functions with the help of the the setting module (for details on how the individual options function see Chap. 4 "Functions")

- Giving out individual coins or emptying the tube cassette
- Resetting the tube counters
- Filling the tube cassette
- Configuring tokens (Teach tokens)
- Displaying the software version of the coin changer

If you are already familiar with how to use the setting module, the appended chapter "Function overview" is more useful than this chapter.

Giving out individual coins or emptying the tube cassette

If you need to give out single coins for a test vend or would like to empty the change tubes for transport, you can do this not only with the help of the keyboard on the coin validator but also with the service function SER 01. A sub-function is assigned to each tube:

Left tube	SER 01 01
Middle left tube	SER 01 02
Middle right tube	SER 01 03
Right tube	SER 01 04

To give out a coin:

1. Press several times on the F -key until you reach the SER menu.
2. Press the E-key twice.
   You are in the first SER 01 01 sub-function. In the second line the number of coins for the left tube will be displayed.
3. If necessary, press several times on the F -key until you find the desired sub-function.
   In the second line the number of coins for the relevant tube will be displayed using the tube counter.
4. Press the E-key several times until the selected tube has given out enough coins.
5. If necessary, press the F -key to go to the next sub-function, in order to pay out further coins from other tubes by pressing the E-key.
6. To return to the previous SER menu or to return the setting module to standby press the −-key.

Resetting the tube counters

Before you refill the tubes (e.g. after transportation of the coin changer), you must set the four tube counters to zero, so that they do not continue to count from the previous stored number of coins. A sub-function is assigned to each tube:

Tube counter left tube	SER 06 01
Tube counter middle left tube	SER 06 02
Tube counter middle right tube	SER 06 03
Tube counter right tube	SER 06 04

To reset the counters:

1. Press several times on the F-key until you reach the SER menu.
2. Press the E-key once.
   You are in the first sub-function SER 01 01.
3. Press several times on the F-key until you reach the function SER 06.
4. Press the E-key twice.
   You are in the first SER 06 01 sub-function. In the second line the number of coins for the left tube will be displayed.
5. Press the key E, + and then press −-key.
   The tube counter is reset (Display: 0000).
6. Press the F-key to go to the next sub-function SER 06 02.
7. Repeat steps 5 and 6 until all counters are reset.
8. To return to the previous SER menu or to return the setting module to standby press the −-key.

Filling the tube cassette

If you would like the filling level of the tubes to be monitored at the time of filling, we recommend that you use the service function SER 05 and not the keyboard on the coin validator for filling.

With the help of the filling level sensors, the filling level of the tubes is displayed in the second line with the following symbols:

Display	Meaning
0	tube empty
0	tube not empty
0	tube full
0	Contradictory messages from the filling level sensors
0	Configured filling levels reached (Float level, maximum number of coins, see section "Configuring float level" and "Configuring maximum number of tube coins" in this chapter)

Check the filling level sensors, if 0 is displayed.

If the cash-box is not empty, it must be emptied now, as the coins which are directed to the cash-box will not be counted. If a float level has been configured, the cash coins will not be accepted at all. In this case the cash-box must not be emptied (see section "Configuring float level" in this chapter).

To fill the tube cassette:

1. Press the +-key.
   You are in function SER 05 01. If all four tubes are empty, the display will show 0000.
2. Insert the coins specified for the four tubes.
   The display changes with the filling level. In addition the coin channels are shown on the bottom right side of the display, in which the relevant coins are accepted

If the float up function is activated, the tubes will only be filled up to a certain filling level, all further coins will be rejected (see section "Configuring float level" in this chapter).

3. To return to the previous SER menu or to return the setting module to standby press the −-key.

Configuring tokens (teach tokens)

Using the service function SER 07, up to 3 tokens can be taught without the PC, directly onto the coin changer, with the help of the setting module. That means, the measured token values, which are generated by inserting the tokens, will be stored in the coin changer. For this there are three memory slots (coin channels) available which have three sub-functions assigned to them in the setting module:

Teach token A in coin channel 14 SER 07 01
Teach token B in coin channel 15 SER 07 02
Teach token C in coin channel 16 SER 07 03

Additionally, a normal or wide acceptance band can be chosen for the respective coin channel. Tokens with deviating measured values will also be accepted in a wide acceptance band later. However, a wide acceptance band makes the acceptance of false coins more likely. Therefore a wide acceptance band should only be configured if a limited number of tokens are available to generate the token measurement values, or if the tokens show very large tolerance values. Otherwise, too many false coins will be accepted.

Teaching token A in coin channel 14:

1. Press several times on the F-key until you reach the SER menu.
2. Press the E-key.
   You are in the first sub-function SER 01 01.
3. Press the F-key several times until you reach the function SER 07.
4. Press the E-key.
   You are in the first sub-function SER 07 01.
5. Press the key E, + and then press −-key.
   You are in teach mode. The second line on the display shows "LO" on the left for "normal acceptance band" and "10" on the right for at least 10 tokens.
6. If required, press the +-key or −-key to store a wider acceptance band.
   The display shows "HI" on the lower left for "wide acceptance band".

7. Insert at least 10 different tokens of the same type into the coin changer.
   The display registers each token inserted and counts backwards from 10 to 0.

An error message is displayed, if less than 10 tokens are inserted or if the defined acceptance band overlaps at least one acceptance band of a coin channel already programmed. The process is aborted.

8. Press the F-key twice to store the token values (display: "Pro") and exit teach mode.
9. To return to the previous SER menu or return the setting module to standby press the -key.

Token B or C is taught using the service sub-functions 07 02 or 07 03.

Displaying the coin changer's software version

The software version of the coin changer can be displayed quite simply by pressing the E-key. It is displayed in the bottom display line.

The line at the top is irrelevant for operating the coin changer and displays the number of memory which the coin changer accesses ("blo 0").

Configuring the coin changer

This section describes how to configure the coin changer with the help of the programming functions in the setting module's PRO menu (for details on how the individual settings function see Chap. 4 "Functions"):

- Configuring float level for filling and emptying the tubes
- Configuring maximum number of tube coins
- Configuring security stock of tube coins
- Configuring security stock, so that it can be paid out by the machine control
- Transmitting the tube filling level including security stock to the vending machine
- Inhibiting coin types
- Disabling the inventory keys
- Disabling the inventory keys, so that they can be enabled by the machine control
- Configuring telephone/currency code
- Suppressing tube counter correction
- Configuring an individual wake-up time
- Configuring the smallest coin value as the basis of calculations for the coin validator
- Configuring sensitivity of the string sensor
- Minimizing string manipulation

If you are already familiar with how to use the setting module, the appended chapter "Function overview" is more useful than this chapter.

Configuring float level for filling and emptying the tubes

In function PRO 24 a number of coins is configured (float level) for each change tube, to which number the tubes ought to be emptied or filled by service personal. At the end the float up function for filling the tubes must be activated, if necessary, in function PRO 04 02.

In PRO 24, a sub-function is assigned to each tube:

Float level left tube	PRO 24 01
Float level middle left tube	PRO 24 02
Float level middle right tube	PRO 24 03
Float level right tube	PRO 24 04

To make it easier for you to determine the float level the following table lists the tube capacities for Euro coins:

Coin type (EUR)	Coin number at 100 % (full sensor)
0.05	87
0.10	76
0.20	68
0.50	61
1.00	62
2.00	65

Setting and activating the float level:

1. Press the F-key several times until you reach the PRO menu.
2. Press the E-key.
   You are in the first function PRO 04.
3. Press the F-key several times until you reach the function PRO 24.
4. Press the E-key to call up the first PRO 24 01 sub-function.
5. Press the E-key again to highlight the current float level displayed on the bottom right in order to enter new float level.
   The last digit of the float level to be entered with 3 digits flashes.
6. Enter the desired number using the +-key or the −-key.
7. Highlight the next digit using the E-key.
8. Repeat steps 6 and 7 until the desired float level is entered.

9. Press the F-key.
   The float level entered is stored.
10. Press the F-key again to call up the next sub-function.
11. Repeat steps 5 to 10 until the float levels for all four tubes are stored.
12. Press the −-key twice to return to the previous PRO menu.

Activating the float up function:

13. Press the E-key once.
    You are in the first sub-function PRO 04.
14. Press the F-key to call up the sub-function PRO 04 02.
15. Press the E-key.
    The last digit is highlighted for the input
16. Press the E-key twice so that the third digit from the right is highlighted.
17. Enter a 1 with the +-key.
    The float up function is activated. By entering "0" the function would be deactivated and when filling, the configured float level would not be taken into consideration.
18. Press the F-key to store the entry.
19. To return to the previous PRO menu or return the setting module to standby press the −-key.

If the float up function is activated, but no float level is configured (float level of individual tube = 000), the tube will be filled until the 50% filling level sensor is covered, or emptied until this same sensor is no longer covered (see also section "Filling level sensors" in Chap. 3 "Design").

Configuring maximum number of tube coins

The maximum number of coins, which are to be sorted into the change tubes, is specified in function PRO 25. For this, a sub-function is assigned to each tube:

Number of coins left tube	PRO 25 01
Number of coins middle left tube	PRO 25 02
Number of coins middle right tube	PRO 25 03
Number of coins right tube	PRO 25 04

To set the maximum number of tube coins:

1. Press the F-key several times until you reach the PRO menu.
2. Press the E-key.
   You are in the first function PRO 04.
3. Press the F-key several times until you reach the function PRO 25.
4. Press the E-key to call up the first PRO 25 01 sub-function.
5. Press the E-key again to highlight the current number set, displayed on the bottom right in order to enter new number. The last digit of coin number, to be entered with 3 digits, flashes.
6. Enter the desired number using the +-key or −-key.
7. Highlight the next digit using the E-key.
8. Repeat steps 6 and 7 until the desired maximum number is entered.
9. Press the F-key.
   The number entered is stored.
10. Press the F-key again, to call up the next sub-function.
11. Repeat steps 5 to 10 until the number of coins for all four tubes is stored.
12. To return to the previous PRO menu or return the setting module to standby press the −-key.

If no maximum number is configured (= 000) the coins will be sorted in the tube until the top 100% filling level sensor displays the message "Tube full" (see also section "Filling level sensors" in Chap. 3 "Design").

The highest coin number that can theoretically be processed is 255.

Configuring security stock of tube coins

The security stock, which should not be paid out of the change tubes, can be specified as a minimum number of coins in function PRO 26 and be set between 1 and 9. For this, a sub-function is assigned to each tube:

Security stock left tube	PRO 26 01
Security stock middle left tube	PRO 26 02
Security stock middle right tube	PRO 26 03
Security stock right tube	PRO 26 04

If the coin changer is to be set in such a way that the security stock can be paid out using the vending machine control (with DISPENSE), please follow the procedures in the next section.

Setting the security stock for tube coins:

1. Press the F-key several times until you reach the PRO menu.
2. Press the E-key.
   You are in the first function PRO 04.
3. Press the F-key several times until you reach the function PRO 26.
4. Press the E-key, to call up the first PRO 26 01 sub-function.
5. Press the E-key again to highlight the current security stock set, displayed on the bottom right in order to enter a new security stock.
   The last digit of the 2-digit coin number flashes.
6. Enter the desired number using the +-key or the −-key (1-9).
7. Press the F-key.
   The number of coins entered is stored.
8. Press the F-key again to call up the next sub-function.
9. Repeat steps 5 to 10 until the security stock for all four tubes is stored.
10. To return to the previous PRO menu or to return the setting module to standby press the −-key.

Configuring security stock, so that it can be paid out by the machine control

If you wish to be able to pay out also the security stock using DISPENSE, this can be activated in function PRO 04 01 for the vending machine control.

In PRO 04 01, several coin changer functions can be activated or deactivated using different input places. The above mentioned function is activated in the following input place:

Pro 04 01
00001000
|
Security stock can be paid out by vending machine

To activate the function:

1. Press the F-key several times until you reach the PRO menu.
2. Press the E-key twice to activate the function PRO 04 01.
3. Press the E-key.
   The last digit is highlighted for the input.
4. Press the E-key 3 times so that the fourth digit from the right is highlighted.
5. Enter a 1 using the +-key.
   The security stock can now be paid out using DISPENSE. By entering "0" the function is deactivated and the security stock cannot be paid out by the vending machine control.
6. Press the F-key to store the entry.
7. To return to the previous PRO menu or to return the setting module to standby press the −-key.

Transmitting the tube filling level including security stock to the vending machine

If you wish the filling level of the tube counter to be transmitted including the security stock in the tubes, you can set it in the function PRO 04 02.

In PRO 04 02, several coin changer functions can be activated or deactivated using different input places. The above mentioned function is activated in the following input place:

Pro 04 02
01000000
Transmit the tube filling level including security stock to the vending machine

To activate the function:

1. Press the F-key several times until you reach the PRO menu.
2. Press the E-key twice.
   You are in the first sub-function PRO 04.
3. Press the F-key to call up the sub function PRO 04 02.
4. Press the E-key.
   The last digit is highlighted for the input.
5. Press the E-key 6 times so that the second digit from the left is highlighted.
6. Enter a 1 with the +-key.
   The security stock will now be transmitted. By entering "0" the function would be deactivated and, the filling level without the security stock transmitted.
7. Press the F-key to store the entry.
8. To return to the previous PRO menu or to return the setting module to standby press the −-key.

Inhibiting coin types

Each coin type which is to be accepted by the coin valiator is stored in a so-called coin channel. If you wish the coins to be inhibited and no longer accepted, their coin channel is to be inhibited.

To improve the recognition of false coins, a maximum of three coin channels with different acceptance band widths can be assigned to the same coin type:

- normal coin channel (low channel number) with wide acceptance band for a possible high acceptance of genuine coins
- If required, narrow coin channel (higher/highest channel number) with narrower acceptance band for improved rejection of false coins
- If required, very narrow coin channel (highest channel number) with extremely narrowed down acceptance band for the highest rejection of false coins and an acceptable acceptance of genuine coins

For most coin types two coin channels – one normal and one narrow – are configured. If you wish to inhibit a coin type, all of the coin channels assigned to it must also be inhibited (normal, narrow, very narrow).

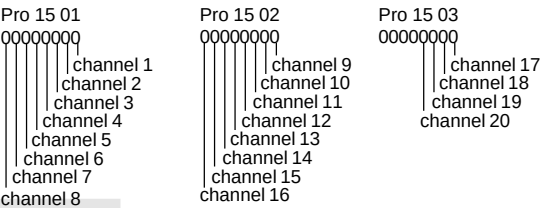
Three sub-functions are assigned to the coin changer's 20 coin channels in function PRO 15:

Inhibit coin channels 1 to 8 PRO 15 01

Inhibit coin channels 9 to 16 PRO 15 02

Inhibit coin channels 17 to 20 PRO 15 03

Each of these sub-functions has eight input options for eight coin channels available. Input "0" means that the coin channel is not inhibited, and will therefore accept programmed coin types. Input "1" inhibits the coin channel. Each of the eight coin channels are assigned to the eight sub-function input options through the following format:



For details on which coin type has been programmed for which coin channel, please contact the NRI company or connect the validator to WinEMP or PalmEMP.

To inhibit a coin channel:

1. Press the F-key several times until you reach the PRO menu.
2. Press the E-key.
   You are in the first function PRO 04.
3. Press the F-key several times until you reach the function PRO 15.
4. Press the E-key to call up the first PRO 15 01 sub-function. (coin channels 1–8).
5. If necessary, press the F-key, until the sub-function 15 02 or 15 03 is called up (coin channels 9–16 and 17–20).
6. Press the E-key.
   The last digit is highlighted for input (coin channel 1, 9 or 17).
7. Press the E-key several times again until the memory location for the coin channel to be inhibited is highlighted.
8. Enter a 1 using the +-key.
   The coin channel is inhibited. By entering "0" the channel will be reactivated and the coin type accepted.
9. Press the F-key.
   The input is stored.
10. To return to the previous PRO menu or to return the setting module to standby press the −-key.

To inhibit a coin type, all of its assigned coin channels (normal, narrow, very narrow) must be inhibited.

Disabling the inventory keys

The inventory keys (L/ML/MR/R), part of the coin validator keyboard, can be disabled in function PRO 04 02, so that they can no longer be used from service personal.

In PRO 04 02, several coin changer functions can be activated or deactivated using different input places. The above mentioned function is activated in the following input place:

Pro 04 02
10000000
|
Disable the inventory keys

How to access and activate the function is described in detail in the section "Transmitting tube filling level including security stock to the vending machine" from this chapter.

Disabling the inventory keys, so that they can be enabled by the machine control

If the inventory keys are to be disabled in such a way that they can be activated by means of the vending machine, this can be set in function PRO 04 01.

In PRO 04 01, several coin changer functions can be activated or deactivated using different input places. The above mentioned function is activated in the following input place:

Pro 04 01
00000100
|
Disable inventory keys, but can be enabled by the vending machine

How to access and activate the function is described in detail in the section "Configuring the security stock, so that it can be paid out by the machine control" from this chapter.

Configuring telephone/currency code

The telephone or currency code, which can be transmitted to the vending machine control for e.g. the dialogue language, is changed in function PRO 52 01.

The language is either set using the international telephone country code (e.g. for English 0044) or using the currency code. For more information on the currency code please refer to the MDB specification "NAMA document MDB/ICP 2.0" (www.vending.org).

To change the codes:

1. Press the F-key several times until you reach the PRO menu.
2. Press the E-key.
   You are in the first function PRO 04.
3. Press the F-key several times until you reach the function PRO 52.
4. Press the E-key to call up the first PRO 52 01 sub-function.
5. Press the E-key again to highlight the current code set, displayed on the bottom right, in order to enter a new code. The last digit of code, to be entered with 4 digits, flashes.
6. Enter the desired last digit using the +-key or the −-key.
7. Highlight the next digit using the E-key.
8. Repeat steps 6 and 7 until all four digits are entered.
9. Press the F-key.
   The telephone code entered is stored.
10. To return to the previous PRO menu or to return the setting module to standby press the −-key.

Suppressing the automatic tube counter correction

If you do not wish the tube counters to be automatically corrected in relation to the monitoring of the filling level sensors, it can be suppressed in function PRO 04 03.

In PRO 04 03, several coin changer functions can be activated or deactivated using different input places. The above mentioned function is activated in the following input places:

Pro 04 03
10000000
| |
Do not correct the tube counter automatically

To activate the function:

1. Press the F-key several times until you reach the PRO menu.
2. Press the E-key twice.
   You are in the first sub-function PRO 04.
3. Press the F-key twice to call up the sub function PRO 04 03.
4. Press the E-key.
   The last digit for the input is highlighted.
5. Press the E-key 6 times so that the second digit from the left is highlighted.
6. Enter a 0 using the +-key.
7. Highlight the first digit from the left with the E-key.
8. Enter a 1 using the +-key.
   No more tube counter corrections will be made. If any other input is entered for these both first digits, the function will be deactivated and the counters corrected.
9. Press the F-key, to store the entry.
10. To return to the previous PRO menu or to return the setting module to standby press the −-key.

Configuring an individual wake-up time

An individual wake-up time can be set in function PRO 53 01, for coin changers which work with battery and external wake-up line. It is set in steps of 0.264 seconds. Settings under 10 (= 2.6 seconds) are ignored. In this case, the coin changer will consider the factory setting of 4 seconds.

To set the wake-up time:

1. Press the F-key several times until you reach the PRO menu.
2. Press the E-key.
   You are in the first function PRO 04.
3. Press the F-key several times until you reach the function PRO 53.
4. Press the E-key to call up the first PRO 53 01 sub-function.
5. Press the E-key again to highlight the current wake-up time set, displayed on the bottom right, for new input.
   The last digit of the time, to be entered with 3 digits, flashes.
6. Enter the desired last digit using the +-key or the −-key.
7. Highlight the next digit using the E-key.
8. Repeat steps 6 and 7 until all three digits are entered.
9. Press the F-key.
   The wake-up time entered is stored.
10. To return to the previous PRO menu or to return the setting module to standby press the −-key.

The highest setting of the wake-up time that can theoretically be processed is 255 (= 67.3 seconds).

Configuring the smallest coin value as the basis of calculations for the coin values

The smallest coin value for the coin changer is the reference value for administering all coin values programmed. The values of all the coin types accepted must be integral multiples of the smallest coin value.

If the smallest value is set in such a way that it is no longer an integral multiple of the programmed coin types, their coin values must be changed accordingly!

The smallest coin value can be changed in function PRO 50 01:

1. Press the F-key several times until you reach the PRO menu.
2. Press the E-key.
   You are in the first function PRO 04.
3. Press the F-key several times until you reach the function PRO 50.
4. Press the E-key to call up the first PRO 50 01 sub-function.
5. Press the E-key again to highlight the current coin value set, displayed on the bottom right, for new input.
   The last digit of the value, to be entered with 4 digits, flashes.
6. Enter the desired last digit using the +-key or the −-key.
7. Highlight the next digit using the E-key.
8. Repeat steps 6 and 7 until all four digits are entered.
9. Press the F-key.
   The smallest coin value entered is stored.
10. To return to the previous PRO menu or to return the setting module to standby press the −-key.

Configuring the sensitivity of the string sensor

For coin changers with string sensor, the senstivity of the sensor can be set in function PRO 21 01. With the setting

00 the maximum sensitivity and

49 the minimum sensitivity (the sensor is only triggered when the acceptance gate is opened by string or coin)

are configured.

With setting 50 the string sensor is deactivated.

To set the sensitivity of the sensor:

1. Press the F-key several times until you reach the PRO menu.
2. Press the E-key.
   You are in the first function PRO 04.
3. Press the F-key several times until you reach the function PRO 21.
4. Press the E-key to call up the first PRO 21 01 sub-function.
5. Press the E-key again to highlight the current sensitivity set, displayed on the bottom right, for new input.
   The last digit of the code, to be entered with 2 digits, flashes.
6. Enter the second digit of the desired sensitivity using the +-key or the −-key.
7. Highlight the next digit using the E-key.
8. Enter the first digit of the desired sensitivity using the +-key or the −-key.
9. Press the F-key.
   The sensor sensitivity entered is stored.
10. To return to the previous PRO menu or return the setting module to standby press the −-key.

Minimizing string manipulation

If you wish the tube coins of the next 100 coins inserted after an attempted string manipulation, to be sorted in the cash-box instead of the change tubes, you can set this in function PRO 04 02.

In PRO 04 02, several coin changer functions can be activated or deactivated using different input places. The above mentioned function is activated in the following input place:

Pro 04 02
00010000

Send the tube coins to the cash-box after a string manipulation

How to access and activate the function is described in detail in the section "Transmitting tube filling level including security stock to the vending machine" from this chapter.

INDEX

50% sensor 20
75% sensor 20

A

Acceptance 37
Acceptance bands 16, 24, 60
  Adjust 42, 51
Adapter
  Update station 12
  Western modular plug – PC 11, 40
Adjustable functions 43
Adjustment 39
  On site 41
  Setting module 53
  Standard 42
  Workshop 40
Advantages 10
Audit 22

B

Barcode 18

C

Capacity, tube 19
Cash-box 16, 29
Cassette
  Empty 22
    Input place, setting module 77
    Operation 30
    Setting module 48
  Empty up to float level 31
  Figure 15, 19
  Fill 22
    Input place, setting module 77
    Operation 32
    Setting module 50
    Starting up 29
  Max. coin number
    Configuration 42
    Input place, setting module 78
    Setting module 56
  Min. coin number
    Configuration 42
    Input place, setting module 78
    Setting module 57, 58, 59
  Remove 19, 22
  Security stock
    Configuration 42
    Input place, setting module 78
CE Certification 38
  Directive 38

Change tubes 19
Empty
Input place, setting module 77
Operation 30
Setting module 48
Empty up to float level 31
Fill
Description 22
Input place, setting module 77
Operation 32
Setting module 50
Starting up 29
Max. coin number
Configuration 42
Description 23
Input place, setting module 78
Setting module 56
Min. coin number
Configuration 42
Description 23
Input place, setting module 78
Setting module 57, 58, 59
Security stock
Configuration 42
Description 23
Input place, setting module 78
Setting module 57, 58, 59
Channels
Narrow 60
Normal 60
Very narrow 60
Chapter guide 8
Charges, electrostatic 14
Check 39
On site 41
Workshop 39, 40
Circuit board direct plug 18
Cleaning 34
Clone, standard configuration 42
Coin acceptance 37
Coin changer operating software
Display 52
Coin channels
Inhibit
Configuration 42
Description 24
Input place, setting module 78
Operation 33
Setting module 60
Narrow 60
Normal 60
Very narrow 60
Coin insert funnel
Description 16
Figure 15
Coin jam 16
Coin number 22
Coin number, max. in tubes
Configuration 42
Setting module 56
Description 23
Input place, setting module 78
Coin number, min. in tubes
Configuration 42
Setting module 58, 59
Description 23
Input place, setting module 78
Coin payout 37
Coin runway 34
Coin stack 23
Coin types
Inhibit
Configuration 42
Description 24
Input place, setting module 78
Operation 33
Setting module 60
New 42
Coin validator 16
Close 34
Description 16
Figure 15, 17
Open 34
Remove 16, 27
Coin validator operating software
Update 12
Coin value, smallest 42
Configuration 66
Input place, setting module 79
Coins, give out 22
Keyboard 30
Setting module 48
Configuration 39
On site 41
Setting module 53
Standard 42
Workshop 40
Configuration environment 11
Configuration tools 11
Conformity declaration 38

Connecting cable
Description 20
Figure 15
Installation 28
Connection
Palm handheld 44
Programming station 44
Setting module 46
Vending machine 27
Conventions, text 8
Conversion rate, second currency
Configuration 42
Description 25
Currency 18
Second 25
Configuration 42
Description 25
Currency code
Configuration 42
Setting module 63
Description 25
Input place, setting module 79

D

Data block download 42
Data block number 18
Decimal point 42
Description 16
Design 15
Device dimensions 37
Device number 18
Device type 18
Diagnosis 16, 41
Figure 80
LEDs 80
Setting module 83
Dialogue language
Configuration 63
Description 25
DIL switches
Description 18
Figure 17, 34
Inhibit coin types 33
Dimensions 37
Directives 38
DIS menu 46
Dismount
Coin validator 16, 27
Tube cassette 19, 22
Display language
Configuration 63
Description 25
Download 42

E

Electrostatic discharge 14
EMC directive 38
Empty sensor 20
Empty tubes
Description 22
Input place, setting module 77
Operation 30
Setting module 48
Up to float level 31
Error 16
Remedy 80
LEDs 80
Setting module 83
Error case 16

F

False coins rejection 39
Fault 16
  Case 16
  Remedy 80
    LEDs 80
    Setting module 83
  Troubleshooting 8
Fill tubes
  Description 22
  Input place, setting module 77
  Operation 32
  Setting module 50
  Starting up 29
Filling level sensors 19
  Description 20
Filling level, tubes 50
  Display 50
Firmware
  Display 52
  Update 12
Flash
  Adapter 12
  Memory 12
  Technology 10
Flash-Prommer 12
Float down, empty tubes 31
Float level 22
  Configuration 54
  Input place, setting module 78
  Tube cassette 22
Float up, fill tubes 32
  Configuration 54
  Input place, setting module 78
  Setting module 50
Full sensor 20
Functions 21
Functions overview, setting module 77

G

General information 8
  Coin changer 9
  Manual 8

H

Holes, mounting 27
Humidity 37

I

Inhibit
  Coin types
    Configuration 42
    Description 24
    Input place, setting module 78
    Operation 33
    Setting module 60
  Inventory keys
    Configuration 42
    Description 24
Insert funnel 15
Installation
  Palm handheld 44
  Programming station 44
  Setting module 46
  Vending machine 27
Instructions, additional 9
Interfaces
  Description 18
  Figure 15, 17
  Vending machine 37
Introduction 8
  Coin changer 9
  Manual 8
Inventory keys
  Inhibit
    Configuration 42
    Description 24
    Input place, setting module 78
    Setting module 62
  Operation 30, 31, 32

J

Jam, coin validator 16

K

Keyboard
- Description 16
- Figure 15
- Inhibit
  - Configuration 42
  - Description 24
  - Input place, setting module 78
  - Setting module 62
- Operation 30, 31, 32
- Setting module 47

L

Label
- Description 18
- Figure 15, 18

Language, machine control
- Configuration 63
- Description 25

LEDs
- Description 16
- Diagnosis 80
- Figure 15, 80

Light-emitting diodes
- Description 16
- Diagnosis 80
- Figure 15, 80

Low voltage directive 38

M

Management, coin number 22
Manuals, additional 9
Manufacture date 18
Markings in the text 8
Max. coin number, tubes
- Configuration 42
  - Setting module 56
- Description 23
- Input place, setting module 78

MDB 9
- Connecting cable
  - Description 20
  - Figure 15
  - Installation 28
- Specification 25, 63

Measurement area 16
Menu structure
- Setting module 46

Min. coin number, tubes
- Configuration 42
  - Setting module 57, 58, 59
- Description 23
- Input place, setting module 78

Motors, payout set 20
Mounting
- Holes 27
- Position 37

N

NAMA 25
New coin 42
Noise immunity 37
Nominal voltage 18, 27, 37
Notes 8

O

Operating instructions, additional 9
Operating software
- Display 52
- Update 12

Operation 30
Order number 18
Ordering code 18

P

PalmE66
Configuration environment 40
Description 41
Installation 44
PalmEMP
Adjustable functions 43
Configuration environment 40
Description 41
Figure 43
Installation 44
Software instructions 9
PalmFlash 12
Payout 37
Payout set
Description 19, 20
Figure 15
PC programming station 11
Description 41
Device environment 40, 44
Figure 43
PC test station 11, 39
PCB direct plug 18
Pilot lights
Description 16
Diagnosis 80
Figure 15, 80
Power consumption 37
PRO functions 53, 78
PRO menu 46
Programming 39
On site 41
Setting module 53
Standard 42
Workshop 40
Programming adapter, update station 12
Programming functions 53, 78
Programming station, PC 11
Description 41
Device environment 40, 44
Figure 43
Proper use 13

Q

Quick diagnosis 80
Figure 80
LEDs 80
Setting module 83

R

Rate, second currency
Configuration 42
Description 25
Remove
Coin validator 16, 27
Tube cassette 19, 22
Requests to perform an action 8
Return 16
Return lever
Description 16
Figure 15
Runway, coin validator 34

S

Safety instructions 8, 13, 14, 37
Second currency
  Configuration 42
  Description 25
Security stock
  Configuration 42
    Setting module 57, 58, 59
  Description 23
  Input place, setting module 78
Sensitivity, string sensor
  Configuration 67
  Description 26
  Input place, setting module 78
Sensors, filling level 20
SER functions 47, 77
SER menu 46
Serial number 18
Service functions 47, 77
Service tools 11, 39
Setting 39
  On site 41
  Setting module 53
  Standard 42
  Workshop 40
Setting module
  Adjustable functions 45
  Figure 45
  Functions overview 77
  General information 45
  Installation 46
  Troubleshooting 83
Setting program
  Configuration environment 11, 40
  Software instructions 9
Smallest coin value 42
  Configuration 66
  Input place, setting module 79
Sorting 19
  Configuration 42
Stack 23
Starting up 29
Status indicator 16
Storage capacity, tube 19
String manipulation, minimize
  Configuration 42, 67, 68
  Description 26
  Input place, setting module 78
String sensor
  Configuration 67
  Description 26
Summary, chapter 8
Switching block
  Description 18
  Figure 17, 34
  Inhibit coin types 33

T

Teach
  Coin type 42
  Tokens 24
Teach coin type 42
Teach tokens 51
Technical data 37
Telephone code
  Configuration 42
    Setting module 63
  Description 25
  Input place, setting module 79
Temperature range 37
Test 39
  On site 41
  Workshop 39, 40
Test software 11, 39
Test station, PC 11, 39
Tester
  Palm handheld 40
  Programming station 11, 40
  Test station 11, 39
  Update station 12
Text conventions 8
Tokens
  Configuration 42
    Setting module 51
  Description 24
  Input place, setting module 77
Touch-sensitive keys 16
Transport 36
Troubleshooting 8

Tube cassette
Description 16, 19
Empty
Description 22
Input place, setting module 77
Operation 30
Setting module 48
Empty up to float level 31
Figure 15, 19
Fill
Description 22
Input place, setting module 77
Operation 32
Setting module 50
Starting up 29
Max. coin number
Configuration 42
Input place, setting module 78
Setting module 56
Min. coin number
Configuration 42
Input place, setting module 78
Setting module 57, 58, 59
Remove 22
Security stock
Configuration 42
Setting module 57, 58, 59
Tube coins
Configuration 42
Tube counter 19, 22
Correct 20
Configuration 42
Description 25
Input place, setting module 78
Setting module 64
Reset
Configuration 42, 49
Description 25
Input place, setting module 77
Tubes 19
Empty
Description 22
Input place, setting module 77
Operation 30
Setting module 48
Empty up to float level 31
Fill
Description 22
Input place, setting module 77
Operation 32
Setting module 50
Starting up 29
Max. coin number
Configuration 42
Description 23
Input place, setting module 78
Setting module 56
Min. coin number
Configuration 42
Description 23
Input place, setting module 78
Setting module 57, 58, 59
Security stock
Configuration 42
Description 23
Input place, setting module 78
Setting module 57, 58, 59

U

Update tools 12

W

Wake-up time
Configuration 42
Setting module 65
Description 25
Input place, setting module 79
Western modular plug 18, 47
Western modular plug-PC-adapter 40
WinEMP
Adjustable functions 42
Description 41
Programming station 11, 40
Software instructions 9
WinFlash 12
WinMDB 11, 39

FUNCTIONS OVERVIEW FOR SETTING MODULE

If at any time you need to refer to the manual quickly, this chapter orders chronologically all SER and PRO functions and their memory locations in the setting module.

SER functions

Function		Meaning
SER	**01**	**Emptying tubes**
	01 01	left tube
	01 02	middle left tube
	01 03	middle right tube
	01 04	right tube
SER	**05 01**	**Filling tubes**
SER	**06**	**Resetting tube counters**
	06 01	left tube
	06 02	middle left tube
	06 03	middle right tube
	06 04	right tube
SER	**07**	**Teaching tokens**
	07 01	Token A in coin channel 14
	07 02	Token B in coin channel 15
	07 03	Token C in coin channel 16

PRO functions

Function		Meaning
PRO	**04**	**Activating (1)/deactivating (0) diverse functions**
	04 01	00001100 Disable inventory keys, so that they can be enabled by the vending machine Security stock can be paid out by the vending machine
	04 02	11010100 Activate float up function Send tube coins to cash-box after string manipulation Transmit tube counter status including security stock to the vending machine Disable inventory keys
	04 03	10000000 Do not correct the tube counter automatically
PRO	**15**	**Inhibit coin channels**
	15 01	channel 1–8
	15 02	channel 9–16
	15 03	channel 17–20
PRO	**21 01**	**Sensitivity of the string sensor**
PRO	**24**	**Float level**
	24 01	left tube
	24 02	middle left tube
	24 03	middle right tube
	24 04	right tube
PRO	**25**	**Maximum number of coins in**
	25 01	left tube
	25 02	middle left tube
	25 03	middle right tube
	25 04	right tube
PRO	**26**	**Security stock in**
	26 01	left tube
	26 02	middle left tube
	26 03	middle right tube
	26 04	right tube

PRO 50 01 Smallest coin value
PRO 52 01 Telephone/currency code
PRO 53 01 Wake-up time

TROUBLESHOOTING

If there is a fault on the coin changer, the pilot lights at the top of the coin validator show where the fault is. In order to diagnose the cause of the fault in detail, the NRI service tools are available (see section "Diagnosis using the setting module" in this chapter as well as Chaps. 1 and 11).

Quick diagnosis using pilot lights

If the green LED at the top lights up or flashes, there are no faults and the device is working properly. If the yellow light in the middle flashes there is a definite fault which in general, can be easily remedied. If the red LED at the bottom flashes, it is probably a fault that must be remedied by a service technician.

The label at the top of the coin validator may help in locating the fault (see Fig. 8).

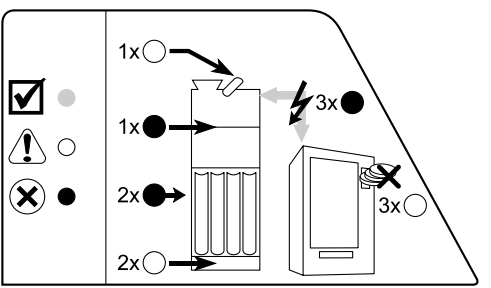


Fig. 8: Quick diagnosis with the help of the pilot lights

LED	Meaning	Troubleshooting
green LED lights up	Coin changer operational	No error
flashes	Filling level mode	No error
green and yellow LED light up	Coin inserted inhibited from the vending machine	Check vending machine settings (possible that high value coins inhibited as tube is empty)
green and red LED light up	Coin inserted inhibited from the vending machine	Activate coin channel using switching block or setting module, WinEMP or PalmE66
yellow LED flashes once	• Return lever pressed • Switch in coin validator defective	• Check return mechanism in vending machine • Service case
flashes twice	• Coins stuck in payout area • Motor failure	• Remove tube cassette and jammed coins, then pay out one coin from each tube using the inventory keys • Service case
flashes 3 times	Coin changer inhibited by vending machine	Check vending machine (possibly empty or defective)

LED	Meaning	Troubleshooting
red LED flashes once	Fault in coin validator	• Remove jammed coins by pressing the return lever on the coin validator • Service case, coin validator may have to be exchanged
flashes twice	Fault in coin changer	Service case, coin validator may have to be exchanged
flashes 3 times	Vending machine no longer communicates with coin changer (has sent no command in 2 secs.)	Check vending machine control or connecting cable

Diagnosis using the setting module

If there is a fault on the coin changer, the setting module displays the appropriate status or error message as soon as you connect it to the coin changer (see Chap. 11 "Configuration"). Depending on operating mode or fault, three status or fault messages are distinguished**:**

- INFO messages: used in general only for information about particular operating states
- AN/AB messages: shows where a coin was accepted (AN)/ why a coin was rejected (AB)
- FE messages: shows why the coin changer no longer functions

Display	Meaning	Troubleshooting
INFO		
InFo-01	• Return lever pressed • Switch in coin validator defective	• No error • Check return mechanism in vending machine • Service case
InFo-09	String sensor active	• Coin on string recognized (no error) • Check sensor (service case)
InFo-09A	Tube coins are sent to the cash-box after a recognized string manipulation	No error, function can be deactivated in PRO 04 02
InFo-80	Coin changer inhibited by vending machine	Check vending machine (possibly empty or defective)

Display	Meaning	Troubleshooting
AN		
An **X** YY	Accepted coin will be sorted into **X = 0** cash-box **X = 1** left tube **X = 2** middle left tube **X = 3** middle right tube **X = 4** right tube	No error
An X **YY**	Inserted coins accepted in the coin channel **YY = 01–16** (channel no.)	
AB		
Ab-01	Measured values of the inserted coin are outside the acceptance band	If necessary, widen acceptance band with WinEMP or PalmEMP
Ab-02	Coin inserted inhibited by the coin changer	Enable coin channel using switching block or setting module, WinEMP or PalmE66
Ab-03	Inserted coin has not passed through measurement section in the appropriate amount of time	• Remove coins or foreign objects by pressing the return lever on the coin validator • Check measurement by air-core coil or CP2 level (service case)
Ab-04	Inserted coin was not recognized	Insert coin again more slowly

Display	Meaning	Troubleshooting
Ab-05	CP3 or CP4 sensor active	• Insert coin more slowly • Insert coin not on string • Check sensors (service case)
Ab-06	Sensor behind the acceptance gate has not recognized inserted coin	• Check acceptance gate with WinEMP or PalmEMP and if necessary, exchange it (service case) • Check CP3 sensor (service case)
Ab-07	Sensor behind the acceptance gate has not recognized inserted coin	• Check acceptance gate with WinEMP or PalmEMP and if necessary, exchange it (service case) • Check CP4 sensor (service case)
Ab-08	Inserted coin has covered the sorting control for too long	• Insert coin more slowly • Insert coin not on string • Check CP4 sensor (service case)

Display	Meaning	Troubleshooting
Ab-09	String manipulation recognized	• Insert coin not on string • If necessary, reduce sensitivity of the string sensor in PRO 21 01 • Clean or exchange string sensor (service case) • Check acceptance gate for ease of movement (service case)
Ab-10	Inserted coin recognized in false money coin channel	No error
Ab-11	Inserted coin recognized as enabling token	No error
Ab-12	Inserted coin inhibited from the vending machine	Check vending machine settings (possible that high value coins inhibited as tubes are empty)
Ab-00	Other fault with coin acceptance	Service case
FE		
FE-01	• Coins jammed in the payout area (left tube) • Motor failure (left tube)	• Remove t. cassette and jammed coins, then pay out one coin from this tube using the inventory key • Service case

Display	Meaning	Troubleshooting
FE-02	• Coin jammed in the payout area (middle left tube) • Motor failure (middle left tube)	• Remove t. cassette and jammed coin, then pay out one coin from this tube using the inventory key • Service case
FE-03	• Coin jammed in the payout area (middle right tube) • Motor failure (middle right tube)	• Remove t. cassette and jammed coin, then pay out one coin from this tube using the inventory keys • Service case
FE-04	• Coin jammed in the payout area (right tube) • Motor failure (right tube)	• Remove t. cassette and jammed coin, then pay out one coin from this tube using the inventory keys • Service case
FE-13	Checksum fault by acceptance band	Check and, if necessary, adjust the acceptance band of the appropriate coin channel with WinEMP or PalmEMP
FE-14	Checksum fault by coin values	Check and, if necessary, correct coin values with WinEMP or PalmEMP
FE-15	Checksum fault by configuration	Check PRO functions with the setting module and, if necessary, correct them

Display	Meaning	Troubleshooting
FE-38	Vending machine no longer communicates with coin changer (has sent no command in 2 secs.)	Check vending machine control or the connecting cable